

AGGGAGAGTCTGCCACAAGTTTGTATATTCTCACTGAGGCATCTATTCAAGTTGGGCAGCAGACA  
CTGACCAACGCTAGCACGGCAATGCTGGTAGCAATGCCCTGCCAGCACTCAGAAAGACGGAGGCA  
GGAGAACATAGCTTCAGTCAGCCTCTTCTACAATATAGTCAGTTGAAAGTCAGCCAGCTTAGACAACA  
TGGAGAGCCTGTGCCGAAAGCCACTGGTAAGCCGAATCTCAGTACCGAGAGAGCTGCCAGGGTGC  
CTGC : AAAAAAAACCTCAAACACAGAAGTAGGGAGGTGTAAAATAAAGTAGTGTAGGGGGTGGAAATT  
AGCTGATGTGGACTTCCAATAAAGTTACCTTTAGATACCTATTAAATCAATAGCATAGACCTGAAAC  
TGTCTATCAGAAAATGTGTCTATTCTGAGGAAGGAGTGCTAACAGAGGTTCTGTGAGGGGGCCTCTGGCT  
TTGAGAGGGTGTACCATCACATAAGACTCTAAAAGCACACATAACTTTATAAATTACCATGAGCTTAAC  
ATCTTCTTGTCAATTGCGAGACTGAGCCATGGAGTCTTCGATGCTGACACCAATTCAACTGACCTACA  
CTCACGGCCCTGTTCAACCCCAAGACATGCCCTCATGGTCATTCTGGTCTCACTTGTCTATTGG  
CTGCTAGGCAATGGGCTGGTGTGGTAGCTGGCGAAAGATGAAAGACGACCGTGAACACAGTCTGG  
TCCTCCATCTCACCCCTGGCGATTCCCTGCTGCCCTCTGCCCTCTGGCTCACCTGATTCT  
CCAAGGACACTGGCCCTATGGCTGTTCTGTGCAAACATTATCCCATCCATTATTCTCAACATGTT  
GCCAGTGTCTTCTGCTTACTGCAATTAGCCTGGACCGATGTCTGATAGTACATAAGCCAATCTGG  
AGAACATCGAAACGTGAGAACCGCCTCGCCATCTGTTGATGTCTGGTGGTAGCCTTGTGATGT  
TGTGCCGTATTGTATACCGTGTACGTTATTGACAATCGAGTATATGTAGATATAATTGAT  
TCCTCCAGGTCAATGATTATTGGGACTACGTGTACAAACTAAGTCTACCAGAAAGCAATTCTACTGATA  
ACTCCACTGCTCAGCTAACACTGGACATATGAATGACAGGTCAGCTCCTCCTGTACAGGCAAGGGATTA  
CTTTGGACAGTTACCAACTGCCCTCCAGTCACAGCCATTCTAACATCTCCTGAAGACTCATTCTCT  
GATTCAAGCAACCAACACCCCCATTATGGGGAAAGCCTCTAACATGCTCTCACAGCCGCCGTACCCAGCG  
GGTTTCTGTTGAAGATCGTAAATCCAATACACTGAACGCTGACGCTTTCTCTGCTCACACAGAACT  
TTTCCCTACTGCTTCTAGGGTCAATTATACCCCTATGATTCCAGGGGATTATGTTGACCAATTCA  
TATGACAATCATGTGCCGACACCGCTGATGCAATAACCATCACAAGGCTGGTGGCTCTGGTGC  
CGTTTTCATCATGGTATTGTTACAGCCTCATCGCTTCTCAGAATGCCAAAAACCAACTTACCAAGTC  
TCGGAACAAACCTTCGGGTGGCTGTGGCTGTGGTCACTGCTTTTATCTGCTGGACTCCATACCAT  
CTTGTGGAGTCCTGCTTATTGATTACTGATCCAGAAAGTTCTTGGGGAAAGCTGTGATGCTCTGG  
ACATGTCCATTGCTTACTGCAATAGTTGCTTCAACCTTCTGTATGCCCTTGGGGAAAGA  
CTTTAGGAAGAAAGCAAGACAGTCTATAAGGGCATTCTGGAAAGCAGCCTCAGCGAAGAGCTCAC  
TCTACCAACTGTACCCAAAGACAAAGCCTCTCAGAAAGAAACATATGAGTACAGATGTGAAAGATGT  
GCCCTGGGAACCTAACGAGAGTTCTCAGGTGAAACAGTGTGATGGATGACATGTGAGCAGGACACT  
ATTGGCGACTCTCAGAGAAAGGTCTTATTGACATCAGCATCTTGAACATTAAGATGCAAAAT  
TTCAAGCCCCATCCAGATGTGTTACTCAGAATCTCTGGCCATGGGACCACTGTTTAACAGGCC  
TTGTTCCATCAGTGTAAATTACCTCATTTGGCTTAGTCTATTCCCATCCCTGACTACACC  
AATGAATAACTTTTACATCTGTTCTGAGTATTCTTCTTCTGACATCTAAACTTCTAGTTG  
CATGGAAGGCTGCTTATTGTTCTGAATGGAAGATATTCAATTATTGTAACAGTTGTTG  
GTGATTTTAAGTGGGAAAGAGACACAGTAACAAAAGATCTATGAAAGCAGGGAGTGTGAGTTAG  
TGTGACAGAACACAGTGCCAAATGCCACCCACTAAAAGCAACCTGAGATAATTCA  
AGTGAGCACAGATAACACACTTCCACTCCTGGAGTGTGTTAGAAGTTGAGCTTGGAGCTC  
(SEQ ID NO:1)

MESFDADTNSTDLSRPLFQPQDIASMVLGLTCLLGLNGLVLWAGVKMKT  
LADFLCCLSLPFSLAHLILQGHWPYGLFLKLIPSII  
LNMFASVFLTAISLDRCLIVHKPIWCQNHR  
NVRTAFAICGVVVAFVMCPVFVYRDLFIMDNRSICRYNFDSSRSYDYWDYVYKLSL  
PESNS  
TDNSTAQLTGHMNDRSAPSSVQARDYFWTVTTALQSQPLTSPEDSF  
LDSANQQPHYGGKPP  
NVLTAAPSGFPVEDRKSNTLNADAFLSAHTELFPTASSGHLY  
PYDFQGDXDQFTYDNH  
VPTP  
LMAITITRLVVGFLVPFFIMVICYSLIVFRMRKT  
NSRNKTFRVAVA  
VVT  
VFFICWTPYHLGVLL  
LITDPESLGEAVMSWDHMSIALASANS  
CFNPFLYALLGKD  
FRKKARQSIKGILEAAFSEELTH  
NCTQDKASSKRNNMSTDV (SEQ ID NO:2)

FIG. 1

underlined = deleted in targeting construct

[ ] = sequence flanking Neo insert in targeting construct

AGGGAGAGTCTGCCACAAGTTTGATATTCTCACTGAGGCATCTATTAGTTGG  
GCAGCAGACACTGAGCAGAACGTAGCACGGCAATGCTTAGCAATGCCTGTCGGCCA  
GCACTCAGAACGAGCAGGAGAACATAGCTTCAGTCAGCCTCTCTACAATATAG  
TCAGTTGGAAGTCAGCCAGCTTAGACAACATGGAGAGCCGTG [GCCGAAAGCCACTGGGTA  
AGCCCGAATCTCAGTAGCAGAGAGCTGCCAGGGTGCCTACTGC : AAAAAAAAACCTCA  
AACAAACAGAACAGTAGGGAGGTGAAATAAAGTGTAGGGGGTGGAAATTAAAGCTGATGTG  
GACTTCAAATAAAGTTACCTTCTAGATACCTATTAAATCAATAGCATAGACCTGAAAC  
TGCTCTATCAGAAAATGTGTCTATTCTGAGGAGGTGCTAACGAGGTTCTGTGAGGGGG  
GCCCTCTGGCTTGAGAGGGTGTACCATCACATAAGACTCTAAAAGCACATACTTTATA  
AATTCACCATGAGCTTAAACATCTTCTTGTCATTTCGCAAGACTGAGCCATGGAGTC  
CGATGCTGACCCAATTCAACTGACACTACACTCACGGCCTCTGTTCAACCCCAAGACAT  
TG ] CCTCCATGGTCATTCTGGTCTCACTTGTCTATTGGACTGCTAGGCAATGGCTGGT  
GCTGTGGTAGCTGGCTAAAGATGAAGACGACCGTGAACACAGTCGGTCTCCATCT  
CACCCCTGGCCGATTCCCTCGCTGCCCTCTCCTGGCTCACCTGATTCT  
CCAAGGACACTGGCCCTAT [GGCTTGTCTCGCAAACATTATCCCATCCATTATTCT  
CAACATGTTGCCAGTGTCTTCTGCTTAAGGCCATTAGGCCCTGGACCGATGTCTGATAGT  
ACATAAGCCAATCTGGGCCAGAACATCGAAACAGTGAGAACCGCCCTCGCCATCTGTGG  
ATGTGTCTGGGTGGTAGCCTTGTGATGTGTGCCCCGTATTGTATACCGTGTCTGTT  
CATATGGACAATCGCAGTATATGTAGATATAATTGATTCCCTCAGGTATATGATTA  
TTGGGACTACGTGT ] ACAAAACTAAGTCTACCAAGAACATTCTACTGATAACTCCACTGC  
TCAGCTAACTGGACATATGAATGACAGGTCAAGCTCCTCTGTACAGGCAAGGGATTA  
CTTTGGACAGTTACCACTGCCCTCCAGTCACAGCCATTCTAACATCTCCTGAAGACTC  
ATTCTCTCTAGATTCAAGAACCAACAACCCATTATGGTGGAAAGCCTCTAACATGTCT  
CACAGCCGCCGTACCCAGCGGGTTCTGTTGAAGATCGTAATCCAATACACTGAACGC  
TGACGCTTTCTCTGTCACACAGAACATTCTCTACTGCTCTAGGGTCATTATA  
CCCCATGATTCCAGGGGGATTATGGTGAACATTACAGCTATGCAATCATGTGCCGAC  
ACCGCTGATGGCAATAACCACATCACAAAGGCTGGCTTCTGGTGCCTGGTGCCTTTCT  
CATGGTAATTGTTACAGCCTCATCGTCTTCAGAACATGCCGAAAACCAACTTCACCAAGTC  
TCGGAACAAAACCTTCCGGTGGCTGGCTGTGGTCACTGTCTTTTATCTGCTGGAC  
TCCATACCACCTTGTGCGAGTCCTGCTATTGATTACTGATCCAGAAAGTTCTGGGAA  
AGCTGTGATGTCCTGGGACCACATGTCCATTGCTTCTAGCATCTGCCAATAGTTGCTTCAA  
CCCTTCTGTATGCCCTTGGGAAAGACTTTAGGAAGAACAGACAGTCTATAAA  
GGCATTCTGGAAGCAGCCTCAGCGAAGAGCTCACGCACACTACCAACTGTACCCAAAGA  
CAAAGCCTCTCAAAAGAACAAATATGAGTACAGATGTGTGAAGATGTGGCCCTGGGAA  
CCTAAGCAGAGTTCTCAGGTGAACAGTGATGGATGACATGTGAGCAGGACACTTAGACA  
ATTGGCGACTCTCAGAGAACAGGCTCTTATGACATCAGCATCTTGAACATTTAA  
GATGAAAATTCAAGCCCCATCCAGATGTGTGACTCAGAACATCTGGCCATGGAC  
CAGTGTAAACAGGCCCTTGTGTTCCATCAGTGTAAAGTTTACCTCATTGGCTTAG  
TCTATTCCCATCCCTGACTACACCAGTGAATGAATAACTTTTCTGTTTCAGTA  
TTCTTTTTTCTGATCATCTAAACTCTAGTTGCTGATGGAAGGCTGCTCTTATT  
GTTCTGAATGGAAGATATTCAATTATTGACAGTTGTGGTGGTACAAGTGTATTAA  
AGTGGGAAAGAGAACACAGTAAGAAAAGATCTATGAAAGCAGGGAGTGTGAGTTAGAGT  
TTGACAGAACACAGTGCCAAATGCACCCACTAAAGCAACCTGAGATAATTCCAGTGT  
CATGTGAGCAAGTGAGCACAGATAACACACTTTCTACTCCTGGAGTGTAGTTAGA  
AGTTGTAGCTGGAGCTC

FIG. 2A

Gene Sequence  
Structure \*

663 bp

Sequence Deleted

859 bp

Size of full-length  
cDNA: 2658 bp



Targeting Vector\* (genomic sequence)

Construct Number: 3036

Arm Length:

5': 3.2 kb

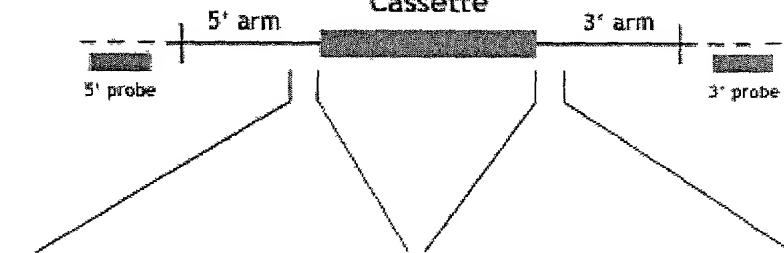
3': 1.8 kb

Targeting Vector  
- - - - - Endogenous Locus

Not drawn to scale

LacZ-Neo

Cassette

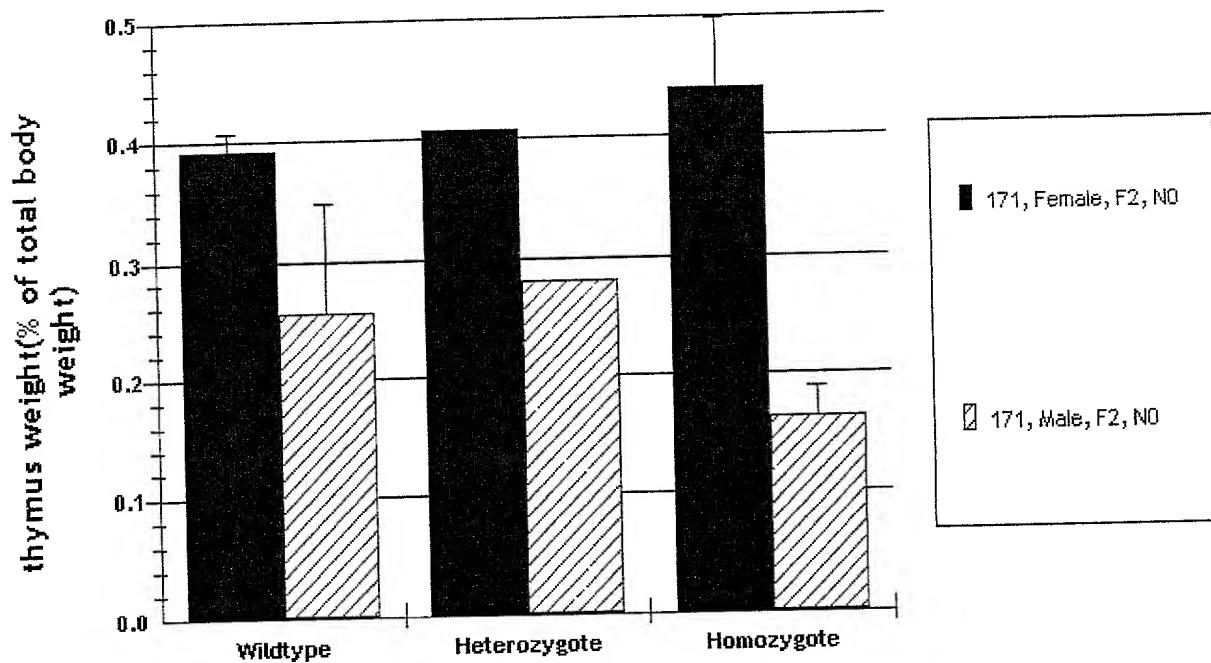


5' >CGAGGTTCTGTGAGGGGGGCC  
TCTGGCTTGAGAGGGTGTACCAT  
CACATAAGACTCCTAAAAGCACAT  
ACTTTTATAAATTCAACCATGAGCT  
TTAACATCTCTTGTCAATTGCG  
AGACTGAGCCATGGAGTCTTCGA  
TGCTGACACCAATTCAACTGACCT  
ACACTCACGGCCTGTGTTCAACC  
CCAAGACATTG<3' (SEQ ID  
NO: 3)

5' >GGCTTGTCTGTGCAAACCTT  
ATCCCACATCCATCATTATTCTCAAC  
ATGTTGCCAGTGTCTCCTGCTT  
ACTGCCATTAGCCTGGACCGATGTT  
CTGATAGTACATAAGCCAATCTGG  
TGCCAGAACATCGAAACGTGAGA  
ACCGCCTTCGCCATCTGTGGATGTT  
GTCTGGGTGGTAGCCTTGTGATG  
TGTGTGCCCGT<3' (SEQ ID  
NO: 4)

FIG. 2B

## necropsy - thymus weight/body weight



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Fig. 3